

Development of Design Tools for the Optimization of Biologically Based Control Systems

Completed Technology Project (2012 - 2016)



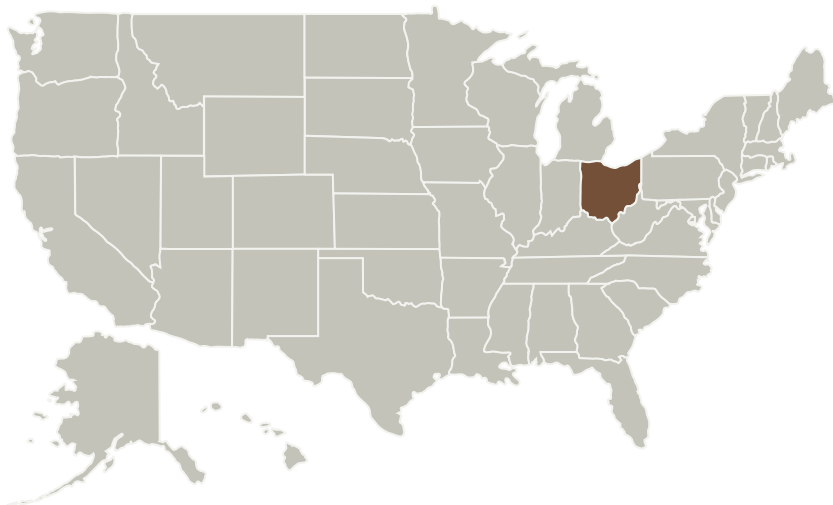
Project Introduction

I plan to develop software that aids in the design of biomimetic control systems by optimizing the properties of the system in order to produce the desired output. Biologically based control systems offer legged vehicles an advantage over the current state of the art. Legged locomotion is the result of many complex, coordinated movements throughout the body, and requires a control system just as complex to produce useful propulsion. Designing such a system from scratch, however, is not easily done without quantification and optimization. Our group has produced some promising legged robot controllers composed of simulated neurons and synapses in a design based on an animal system, but in order to achieve the coordination and adaptability of an actual organism in a particular robot, the properties of each neuron, synapse, and muscle must be tuned. Therefore, if a reliable biologically based control system is to be developed, the entire system, neural and mechanical, must be optimized.

Anticipated Benefits

Biologically based control systems offer legged vehicles an advantage over the current state of the art. This project aims to develop software that aids in the design of biomimetic control systems by optimizing the properties of the system in order to produce the desired output.

Primary U.S. Work Locations and Key Partners



Project Image Development of Design Tools for the Optimization of Biologically Based Control Systems

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Primary U.S. Work Locations

Ohio

Images



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Project Image Development of Design Tools for the Optimization of Biologically Based Control Systems (<https://techport.nasa.gov/image/1749>)

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Space Technology Research Grants

Project Management

Program Director:

Claudia M Meyer

Program Manager:

Hung D Nguyen

Principal Investigator:

Roger Quinn

Co-Investigator:

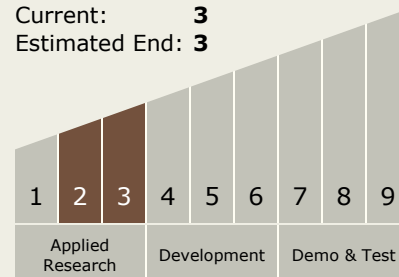
Nicholas Szczecinski

Technology Maturity (TRL)

Start: 2

Current: 3

Estimated End: 3



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.3 Aeroelasticity

Target Destination

Mars